



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**NATIONAL MARINE FISHERIES SERVICE/NOAA FISHERIES**

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## **CRUISE REPORT<sup>1</sup>**

**VESSEL:** *Townsend Cromwell*, Cruise 00-11 (TC-261)

**CRUISE PERIOD:** 08 September-06 October 2000

**AREA OF OPERATION:** Northwestern Hawaiian Islands (NWHI)

**TYPE OF OPERATION:** Personnel from the Coral Reef Ecosystem Investigation, Honolulu Laboratory, National Marine Fisheries Service, NOAA, conducted reef assessments/monitoring in waters surrounding the NWHI.

**ITINERARY:**

08 September      Departed Honolulu.

09 September      Arrived Nihoa Island. Conducted two towed-diver digital video habitat surveys/fish counts (~6 km) along E, S and W shores. Conducted one complete (fish and benthic) rapid ecological assessment (REA) along W side. Conducted a second fish assessment along SW side. Conducted one remote-sensing ground-truth dive. Disembarked Flint/Nishida and established short camp on Nihoa.

10 September      Arrived Necker Island. Conducted four towed habitat surveys/fish counts around entire island (~10 km). Conducted three complete REA dives along S and W sides. Completed three remote-sensing dives. Conducted Necker conductivity-temperature-depth (CTD).



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<sup>1</sup> PIFSC Cruise Report CR-05-009  
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- 11 September Conducted French Frigate Shoals (FFS) CTD. Arrived N anchorage FFS. Conducted four towed habitat surveys/fish counts along NE outer barrier reef and patch reefs of the N lagoon interior (~12km). Fish team conducted two dives to intercalibrate between NWHI Coral Reef Assessment and Monitoring Program (NOW-RAMP) fish assessment protocols and reef fish assessment protocols of DeMartini and Parrish used at FFS and Midway since 1992. Benthic team conducted two REAs in the vicinity of fish calibration surveys. Off-loaded four pallet loads of supplies to U.S. Fish and Wildlife Service (USFWS) Tern Island field station.
- 12 September Conducted five towed habitat surveys/fish counts along ENE and N outer barriers (~13 km). Fish team conducted three additional fish assessment intercalibration dives. Benthic team conducted three REAs near the fish assessment sites.
- 13 September Conducted three towed habitat surveys/fish counts along E inner barrier, East Island W side, and around La Perouse Pinnacles (~10 km). The tow vessel experienced significant outboard motor problems (Honda 75 had to be replaced with Honda 50). Three benthic and fish REAs were completed in the central portion of FFS. The remote-sensing team surveyed the outer barrier, conducted shallow water CTDs every 2 nautical miles (nmi)..
- 14 September Conducted three towed habitat surveys/fish counts along interior patch reefs and along the inner barrier of the Gin Islands (~9 km). The tow vessel experienced significant outboard motor problems using the spare engine (Honda 50). The benthic and fish teams completed three REAs at the south central portion of the atoll. Remote-sensing team joined the benthic team.
- 15 September Conducted five towed habitat surveys/fish counts along outer barrier, SE and S and southern interior patch reefs (~12 km). The fish, benthic and remote-sensing teams completed three REAs along S portion of FFS.
- 16 September Conducted one towed habitat survey/fish count around Gardner Pinnacles in large NW swell (~12-15 ft) (~3 km). High swell and surge, low visibility prevented fish and benthic teams from working.
- 17 September Conducted Maro Reef CTD. Arrived Maro Reef. Conducted five towed habitat surveys/fish counts along reef spurs of S end of Maro Reef (~14 km). Benthic, fish and remote-sensing teams conducted three REAs at S end of Maro Reef.

18 September	Conducted four towed habitat surveys/fish counts along N and central reef spurs at Maro Reef (~12 km). Benthic, fish and remote-sensing teams conducted three REAs in central Maro Reef.
19 September	Conducted four towed habitat surveys/fish counts along S and central reef spurs at Maro Reef (~11 km). Benthic, fish and remote-sensing teams conducted three REAs in S central Maro Reef.
20 September	Conducted four towed habitat surveys/fish counts along NW and W reef spurs (~12 km). Benthic, fish, and remote-sensing teams conducted two REAs along NW portion of Maro Reef. Large NW and SW swells prevented work in some areas.
21 September	Conducted Laysan CTD. Arrived Laysan Island. Conducted six towed habitat surveys/fish counts around all of Laysan Island (~15 km). Benthic, fish and remote-sensing teams conducted three REAs at N and E sides of Laysan. Provided water and supplies to USFWS personnel on Laysan.
22 September	Conducted Lisianski CTD. Arrived Neva Shoals/Lisianski Island. Conducted four towed habitat surveys/fish counts along E and SE sides of Neva Shoals (~12 km). Benthic, fish and remote-sensing teams conducted two REAs.
23 September	Conducted four towed habitat surveys/fish counts along NE and N sides of Neva Shoals/Lisianski Island (~11 km). Fish, benthic and remote-sensing teams conducted three REAs. Departed Lisianski Island en route to Midway Atoll to effect repairs to ship's service diesel generators by picking up contracted electrician. Departure estimated to result in 2 days of lost production time.
24 September	In transit to Midway. Arrived at Midway at 1600 and departed Midway at 1900. Ship proceeding to Pearl and Hermes Reef.
25 September	Arrived Pearl and Hermes Reef. Conducted six towed habitat surveys/fish counts around NE and E outer barriers (~17 km). Fish, benthic and remote-sensing teams conducted three REAs of NE and E outer barrier.
26 September	Conducted six towed habitat surveys/fish counts around SE and S outer barrier and central lagoon (~17 km). Fish, benthic and remote-sensing teams conducted three REAs in E and S lagoon interior and S outer barrier.
27 September	Conducted five towed habitat surveys/fish counts of W and SW outer barrier and W open lagoon interior (~15 km). Fish, benthic

and remote-sensing teams conducted two REAs in W and central lagoon interior. Departed for Lisianski Island and Neva Shoals.

- 28 September Arrived Lisianski/Neva Shoals. Conducted four towed habitat surveys/fish counts along W and SW portion of Neva Shoals (~12 km). Fish, benthic and remote-sensing teams completed two REAs of SW Neva Shoals. High NW swell caused high surge and low visibility.
- 29 September Conducted three towed habitat surveys/fish counts along NW and W sides of Lisianski Island (~9 km). Fish, benthic and remote-sensing teams conducted one REA near Lisianski Island. Continued low visibility and squally weather hampered all teams. Departed Lisianski en route to Midway Islands to disembark contractor electrician hired to troubleshoot generator problems.
- 30 September In transit. Arrived Midway at 1700 to disembark electrician, crew member, and scientist Matt Dunlap and pick up parts for generators and small boat engines. Departed Midway at 1930 en route to Pearl and Hermes Reef.
- 01 October Arrived Pearl and Hermes Reef. Conducted two towed habitat surveys/fish counts along NNW outer barrier reef (~5 km). Experienced problems with outboard motor of towing vessel. Fish and benthic teams completed three REAs of W, SW and S outer barrier reefs. Departed Pearl and Hermes Reef en route to Kure Atoll.
- 02 October Arrived Kure Atoll. Conducted six towed habitat surveys/fish counts along NE, N, NW, W and SW outer barrier reefs (~18 km). Fish, benthic and remote-sensing teams completed three REAs along N, NW and W sides of outer barrier.
- 03 October Conducted six towed habitat surveys/fish counts along E, SE, S and SW outer barrier and western entrance into the lagoon (~17 km). Fish, benthic and remote-sensing teams completed three REAs along E and S outer barriers and in the lagoon.
- 04 October Conducted four towed habitat surveys/fish counts along the inner barrier of NE and N sides and over patch reefs of the lagoon interior (~14 km). Fish, benthic and remote-sensing teams completed three REAs in the inner barrier and interior lagoon. Departed Kure en route to Pearl and Hermes Reef. Conducted CTD off Kure.
- 05 October Arrived Pearl and Hermes Reef. Conducted five towed habitat surveys/fish counts along the NW and SE outer barriers and NW reef flat (~15 km). Fish, benthic and remote-sensing teams

conducted three REAs of NW and SE outer barriers and SE inner barrier and reef flat. Departed Pearl and Hermes Reef en route to Midway Atoll. Conducted CTD off Pearl and Hermes Reef.

06 October Conducted CTD off Midway Atoll. Arrived Midway Atoll. Fish team conducted intercalibration surveys between time series protocols at Midway and REA protocol. End of cruise.

## **MISSIONS AND RESULTS:**

63	Rapid Ecological Assessments of corals, fish, algae and invertebrates.
4	Additional reef fish assessment to calibrate protocols.
105	Towed diver digital video habitat surveys/fish counts/temperature-depth transects (~301 km).
215	Hours of digital video footage.
31	CTD stations.

### Benthic Team Mid-Season Update:

To date, the benthic team has collected data at 38 different sites (Nihoa = 1, Necker = 3, French Frigate Shoals = 15, Maro Reef = 11, Laysan = 3, Lisianski = 5). Because of the time required for the post-dive processing of material, invertebrate data has been collected at only 30 sites. All sites ranged in depth from 10 ft to 60 ft and most had hard bottoms; a few soft bottom sites have been investigated, but at this time, soft bottom sites have been disproportionately sampled. Methodologies for the benthic team have focused on specimen collection (invertebrates and algae) and/or infield data acquisition (coral and macroinvertebrates) with the goal of acquiring a comprehensive catalogue of species diversity and relative abundance.

No final data are available, but preliminary observations suggest each location has a diverse and different flora and fauna. For invertebrates, high diversity of macroinvertebrates was observed at French Frigate Shoals while Maro Reef had a depauperate echinoderm and macroinvertebrate fauna. In general, the flora and fauna of Maro Reef was unusual compared to other sites. Nearly every Maro Reef site had low coral cover and high cover of algal turf compared to other sites. This may be related to its depauperate urchin fauna. Laysan had an unusual algal flora compared to the other islands; several forms/species were collected at Laysan that had not been seen at previous sites. Coral diversity and cover at Lisianski was high relative to other locations.

After several difficulties with faulty equipment, Daria Sciliano (Hyperspectral Team) has managed to collect an entire suite (both hyperspectral signatures for her library and water column data) of usable data at Lisianski. At other sites, she was only able to obtain limited hyperspectral signatures for her library. Poor water conditions and equipment difficulties at Maro Reef limited her ability to acquire data. Her problems have been solved, however, and, she should be able to collect more data at future sites.

**SCIENTIFIC  
PERSONNEL:**

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National Marine Fisheries Service (NMFS), Honolulu Laboratory (HL)  
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Attachments

Figure 1.--Track of NOAA ship Townsend Cromwell cruise TC-00-11 (TC-261) September 8 to October 6, 2000.